Studio Capture

User manual for version 4

Introduction

Studio Capture is a video and still image capturing software with special overlay facilities. Images and video's can be annotated with title, scalebar, date/time and, when connected, temperature from a microscope hot stage.

Studio Capture is designed for time-lapse video capture, i.e. playback frame rate greater than capture frame rate, making it ideal for slow processes.

Still images can also be captured allowing your video camera to be used as a digital still camera.

Hardware requirements

Studio Capture is designed to operate with standard frame grabber cards using Windows driver model (wdm) direct show drivers. Suitable cards include those from Osprey, Hauppauge and Pinnacle systems. In addition you need a video camera with suitable connection to your frame grabber card.

Digital cameras using USB2 and IEEE firewire interface can also be used provided they have wdm direct show drivers.

Connecting a video source

When you start Studio Capture you will need to connect to your video source. Click on the select video device button on the toolbar.

The installed devices will be listed and you should select the device you want to connect to.

The video will be displayed in the main program window.

You can resize the window by dragging the corners or using the window controls (minimise, restore and maximise). Please note that resizing the window does not change the actual resolution of the video. When you resize the window the effective zoom factor will be displayed in the status bar at the bottom of the screen.

To change the video size (resolution) press the set video size toolbar button. The available video formats will be displayed along with the colour depth. If possible select a 16 bit or 24 bit RGB colour depth.

If you have a frame grabber card that has more than one input then you will need to select the connected input. Click on the show video input's toolbar button to display the input dialog box. Select the input that your camera is connected to.

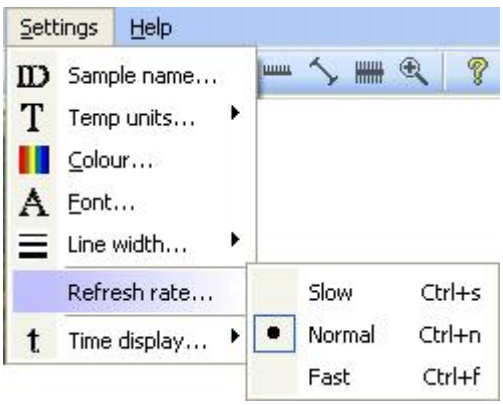
Changing video settings

You can change the brightness, contrast and colour settings of the video signal.

Click the set brightness and contrast button on the toolbar.

Move the slider controls to adjust the settings to your liking or set auto adjust if available.

In addition you can select the video refresh rate, which may be necessary on slower systems to improve performance. Select the "settings" menu and then the "refresh rate" menu to show a selection box where you chose fast, medium or slow. The setting for refresh rate does not affect the video file frame capture rate, except for when the capture rate is set to Max. In this case the video capture rate also depends upon the refresh rate where refresh slow = 2 fps, refresh normal = 5 fps and refresh fast = 10 fps. Depending upon the performance of your PC it may not be possible to save at 10fps in all video formats and with all CODEC's. You should experiment with different settings to see which are best on your system



Auto connecting video device

You can configure Studio Capture to automatically connect to your video camera on start-up. Make sure the video / device / autoconnect menu is checked.

Adjusting other video settings

Some firewire cameras may require you to use their own software to set some camera parameters such as white balance. To do this click on the video / set IEEE camera W/B menu. The first time you do this you will be prompted to locate the application. The camera software will start and you can set the white balance. When you close the camera application you will return to Studio Capture and you can reconnect the camera using the camera toolbar button or the video / device/ connect menu.

Selecting overlays

The video and image files can include overlayed information. Options are:

Sample ID: A sample ID can be entered and displayed. Click on the ID toolbar button to toggle this overlay and click on the settings/sample name menu to enter the name.

Temperature: If the FP90 is connected then you can toggle the temperature overlay using the temperature toolbar button. The units can be 'C or K and are selected from the settings/Temp Unit's menu.

Date/time: The date and time overlay can be toggled using the toggle date/time overlay toolbar button.

Scalebar: The scalebar overlay can be toggled using the toggle scalebar overlay toolbar button.

Ruler: Features in the image can be measured using the ruler function. The ruler overlay is toggled using the toggle ruler overlay toolbar button. To draw the ruler click the left and right mouse buttons whilst holding down the control key. A line is drawn between the points marked and the length displayed in the middle of the line.

Text background: To enhance the visibility of the overlay text against changing images it can be drawn with a dark background. This is switched on by default. To toggle the background on/off click on the video image whilst holding down the shift key.

Positioning overlay text: The layout of the text overlay can be set in 1 of 2 positions.

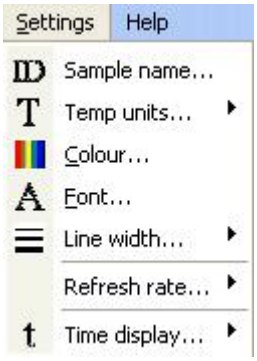
4 corner overlay places the text in the corners of the screen. Compact overlay places the scalebar in the bottom right corner and all other text overlays in the bottom left corner of the video

Toolbar commands

The toolbar provides rapid access to the common controls in Studio Capture. From left to right they are:

Video file setup	initialise avi file
Video file start	start/pause recording
Video file stop	stop recording
bmp file save	save bitmap image
jpg file save	save j-peg image
Copy	copy image to clipboard
Video device	select video input device
Video format	set video size and colour depth
Video inputs	select video input channel (S-VHS,Composite)
Video settings	set video contrast and brightness
Title overlay	toggle title overlay
Temperature overlay	toggle temperature overlay
Time overlay	toggle time overlay
Scale bar	toggle scalebar overlay
Ruler	toggle ruler overlay
Calibration	open microscope calibration menu
Zoom	show a digitally zoomed area of the video
Help	display help file

Overlay Font

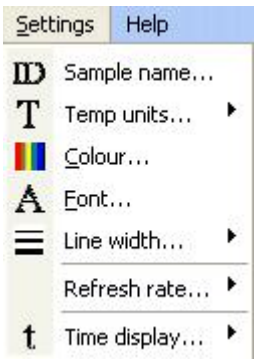


You can change the style and size of the text overlay.

From the settings menu select Font... to open a font selection dialog box.

Select the font size and face to your liking. Note that font style attributes such as bold, italic and underline are not supported in this version of Studio Capture. Press OK to confirm, or cancel to ignore changes.

Overlay Colour

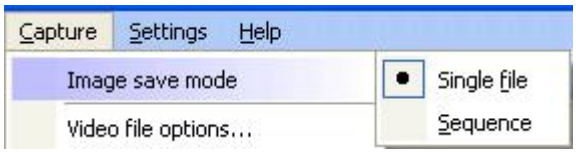


You can change the colour of the overlayed text and lines.

From the settings menu select Colour... to open a colour selection dialog box.

Select the colour to your liking and press OK to accept or Cancel.

Setting options for image file saving mode



You can save images in bitmap and jpeg format.
Also you can choose to save single images or a series of images.
The Capture/image save mode menu allows you to select single file or sequence modes.

Saving bitmap files

To save an image as a bitmap (.bmp) file click on the save bmp button on the toolbar.

A file dialog box opens where you can select a filename and directory to save the image.

Saving j-peg files

To save an image as a compressed j-peg (.jpg) file click the save jpeg button on the toolbar.

A file dialog box opens where you can select a filename and directory to save the image.

Copy to Clipboard

You can copy an image directly to the system clipboard for transfer into other applications.

Click the copy button on the toolbar.

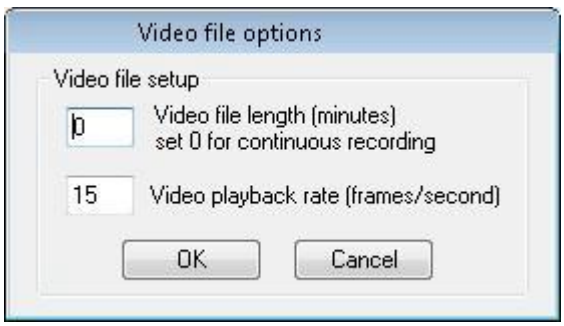
Video file length

The end of the video file can be controlled by the user (stop button), triggered by the FP90 controller or programmed to auto stop after a certain time.

To have the video start and stop to be triggered by the FP90 controller make sure that the "autostart/stop" menu item is checked in the controller menu.

The FP90 trigger should only be used for non-linked methods. If you are using linked methods (for example a heat/cool/heat cycle) then you should manually start and stop the video capture or use the timed auto stop function detailed below.

To program a timed auto stop (useful, for example, if a long measurement is being made) select the "Capture" menu then "video file options".

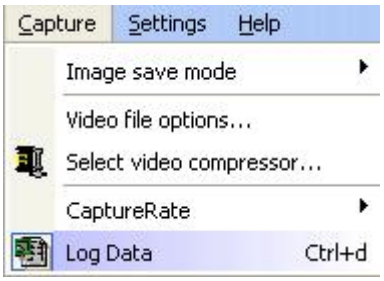


Enter the video file length in minutes (Max 999).

This will calculate the number of frames to capture.

The number of frames to be captured will be displayed in the status bar during the capturing process.

Setting up the data file



In addition to saving a video file you can also chose to save digital data. To active the data logging click the "log data" option under the capture menu (if selected it is ticked). If you want to deactivate data logging simply untick the data logging option.

The data file will be automatically created using the same name as your video file but using .xls as the file extension. The .xls file will be saved in the same folder as your video file.

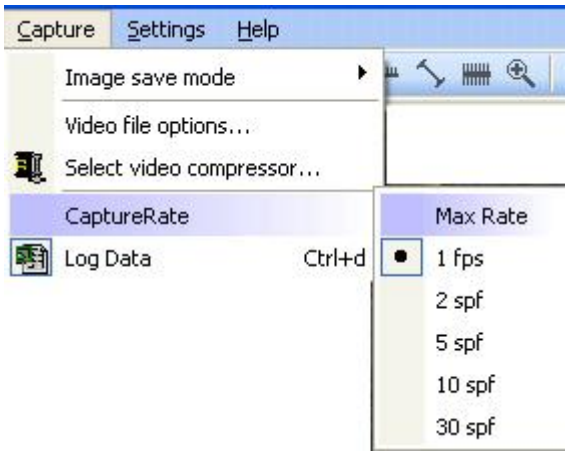
Contents of the data file

The data file contains 4 columns of data. Column 1 is the time relative to the start of the test, column 2 is the temperature, column 3 is the average image intensity (brightness), and column 4 is the optional output of the FP90 controller. The value of this 4th column depends upon which module is connected. With the FP82 the data is the output from the photomonitor. With the FP84 the data is the DTA signal.
Note that if the maxrate is set for the video frame capture rate then the time index will increase by 1 every time a frame is saved. This is because the actual time interval between frames will vary from system to system. For all other frame capture rates the time interval between data points will be correct.

Using the data file

At the end of the measurement the data file can be opened in graph drawing software such as Microsoft Excel (double clicking on the file will open it in Excel thanks to the .xls file extension). Other graphing software can also be used since the data format in the file is tab separated.

Capture frame rate



You can select the video capture frame rate from the "Capture" menu.

The active rate will be ticked and also shown in the status bar at the bottom of the main window.

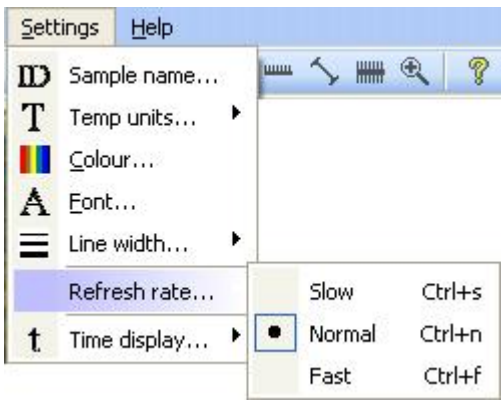
To select a different rate hi-light the new rate from the list.

The rate chosen will affect the file size of the saved video and also the temperature resolution when used with a thermometer.

For temperature scanning work a capture rate of 1 frame per second (fps) is recommended along with a heating rate of 6'C/min. This gives 1 frame of video for every 0.1'C temperature change.

For long experiments capture rates of between 2 and 30 seconds per frame can be set to reduce file size.

If you chose max rate then the system will capture a frame as often as possible up to a maximum of 10 frames per second.
The actual rate is influenced by the video refresh rate.



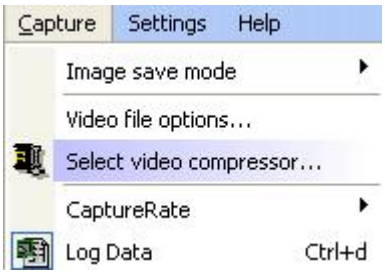
If the refresh rate is set to slow then the max rate is 2 frames per second.
If the refresh rate is set to normal then the max rate is 5 frames per second.
If the refresh rate is set to fast then the max rate is 10 frames per second.
Depending upon the image size and your system performance the actual capture rate may be less that indicated above.

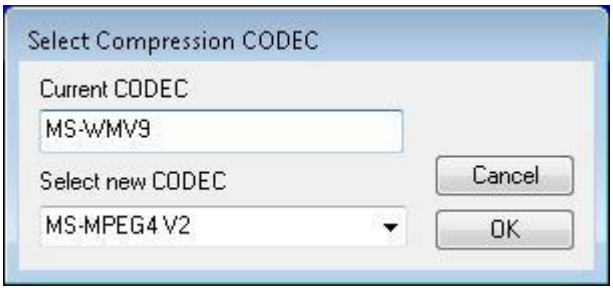
Setting up the video file

In order to capture a video file you need to specify a filename and video CODEC (compression used to reduce file sizes).

This can either be predefined for all video files or selected for each individual video file.

To predefine the CODEC click the "Capture..Select video compressor" menu to open a new dialog box.

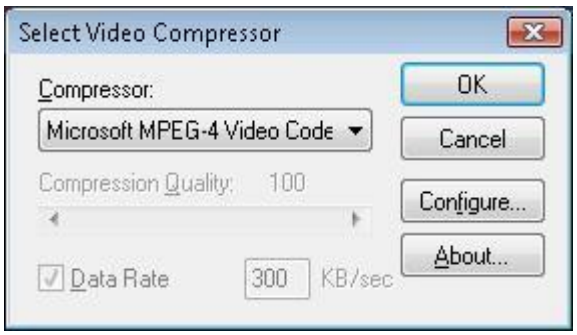




Hi-light the required CODEC from the list and press OK to accept and save or press cancel to retain the current setting. If you chose "Chose and configure CODEC" then you will be prompted for a CODEC as part of the video file setup procedure. Note that the chosen CODEC is save and reselected when you next start Studio Capture.

Once the CODEC is defined you can click the film icon on the toolbar to open a file dialog where you can enter a filename and directory to save the video file. (If an overlay title is set then the filename will initialise to this name).

If you previously close to Select from all installed CODEC's you are required to select the CODEC from the drop down list. You can also select advanced CODEC options if available.



After you select the CODEC the system is ready to start recording but is paused.
You can start recording by pressing the OK button on the window that appears on top of the video image.

If you have selected to use the FP90 to control the video capture (autostart) then recording will start as soon as the FP90 begins the measurement.

Recommended CODEC's are the Microsoft Mpeg4 V2 CODEC and the Microsoft Media 9

CODEC but you should experiment to find the most appropriate in terms of file size and image quality for your application.

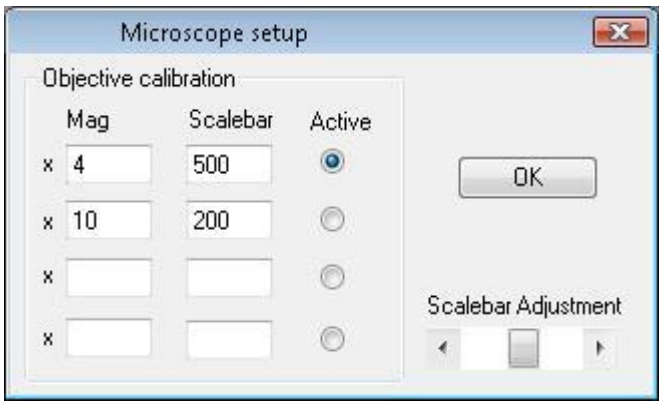
Depending upon your system you may not be able to capture at 1 frame per second with large video images. In this case you should reduce the capture rate or select a smaller video format.

If you send your video's to other people then they will need the same CODEC installed on their system in order to playback the video files.

Microscope Calibration

The overlay scalebar can be calibrated for up to 4 objective lenses.

Click the show calibration menu icon on the toolbar. The scalebar will automatically be overlayed into the image if not already selected.



You can adjust the length of the overlayed scalebar using the slider control to be the same length as a stage reticule.

Up to 4 objective lenses can be installed and the magnification and scalebar length entered into the form. These settings are automatically saved when you press the Set button.

To select the scalebar legend click the "active" radio button alongside the appropriate lens setting.

Hot-stage controller

Studio Capture is designed for use with the FP90/82 and FP90/84 Hot Stage systems from Mettler Toledo.

You can connect the FP90/82/84 to either the Com1 or Com2 ports. If you connect it to Com2 then select Com2 from the "Controller" menu.

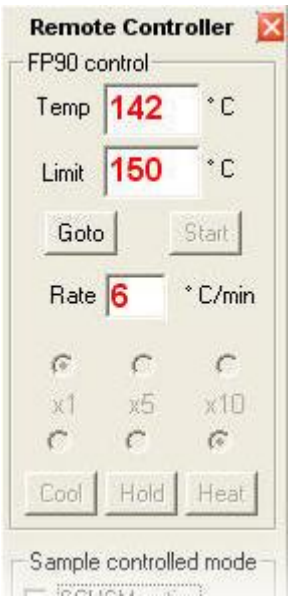
If you are not connecting a hot stage then select "no controller" from the controller menu.

You can also configure the system to control the video capture from the FP90. Check the autostart/stop menu to activate FP90 control. Note that this is not suitable for use with linked methods, as the video file will be stopped at the end of the first method. For these applications you should manually stop the video or pre-set the length of the video file (capture menu - video file options).

When the hot stage is connected the temperature can be overlayed into the image. This is controlled by the temperature icon on the toolbar. You can select 'C or Kelvin for the temperature units (default is 'C) from the settings menu.

Remote control function

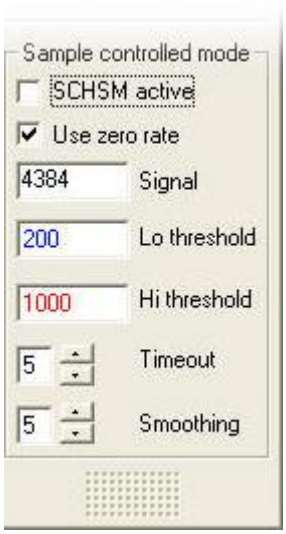
This allows you to "drive" the FP90 from the software.
To activate remote control mode select Remote Control from the controller menu (press Ctrl r) and the controller window will open.
To move the remote controller window click on the gripper at the bottom and drag the window.



You can enter a start temperature and a heating rate. Then press the Goto button to send the hot stage to the starting temp. Once the temp is stabilised press the Start button to begin the program. You can alter the heating rate by entering a new value, or increase by a factor of 5 or 10 up to a maximum rate of 20K/min.
You can also pause the program and alternate between heating and cooling.

In remote control mode you must manually start and stop the video capture.
Due to temperature lags in the system the set point temperature may be in advance of the actual temperature when using faster heating rates (above 6K/min) or when switching rapidly between heating and cooling.

Sample Controlled Hot Stage Microscopy option.



This uses a feedback loop based on the changing light intensity to alter the heating rate. When the intensity is changing the heating rate is reduced and when the light intensity is constant the rate is increased.
The current changing intensity value is displayed as the signal.

The user can set a number of parameters in this mode as follows:
1: Lo threshold - this sets the value for the change in light intensity below which the system will increase the heating rate.
2: Hi threshold - this sets the value for the change in light intensity above which the system will decrease the heating rate.
3: timeout - this sets the delay time (in seconds) following a change in rate before another change will take place.
4: smoothing - this sets the number of values to be averaged in the derivative calculation
5: SCHSM active checkbox - activates sample controlled mode.
6: Use zero rate checkbox - determines if heating rate can go to 0 or 0.1K/min as minimum

Note that in sample controlled mode the variable heating rates are pre-set to this sequence: (0),0.1,0.2,0.5,1,2,3,and 6'C/min

You should start a heating or cooling ramp before activating the sample control mode and set the initial rate to 6'C/min. During the measurement you can adjust the Hi and Lo threshold, smoothing and timeout values to suit the sample you are analysing.

In remote control mode you must manually start and stop the video capture.
Due to temperature lags in the system the setpoint temperature may be in advance of the actual temperature when using faster heating rates (above 6K/min) or when switching rapidly between heating and cooling.

V-Temp function

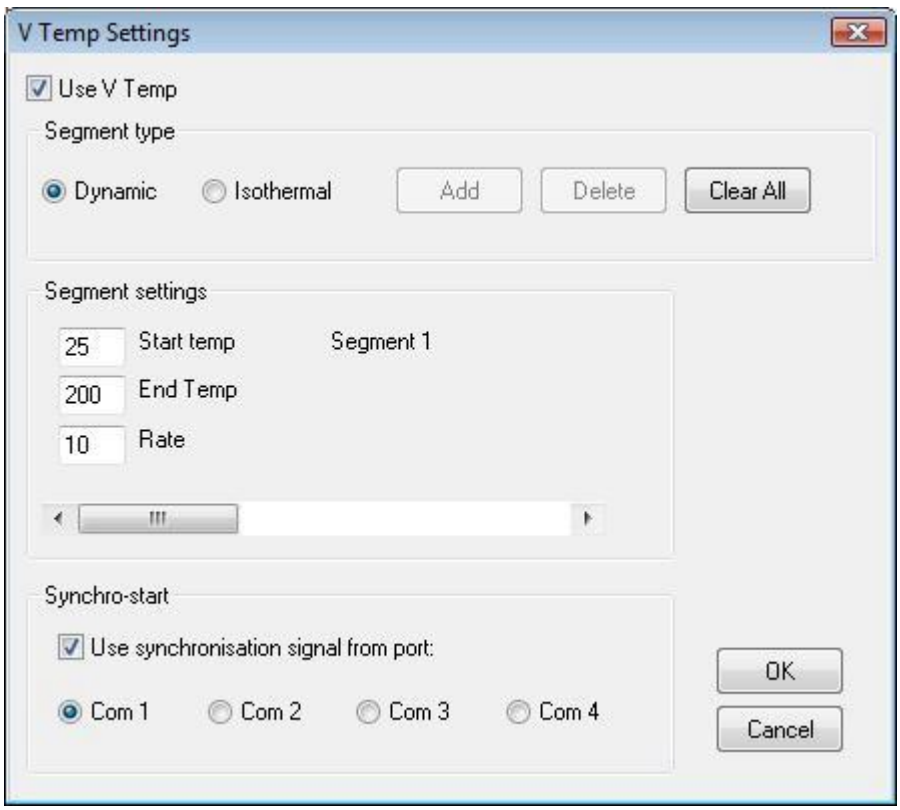
Studio Capture can also be used with other temperature controlling devices, such as DSC systems and hot stages from other manufacturers. In these cases the actual temperature is not sent to Studio Capture, but the V temp function provides a convenient way of displaying the "assumed" temperature onto the video image. This adds greatly to the usefulness of these other thermo optical measurements.

Setting up the V temp display

In order to use V temp the "no controller" option must be selected from the controller menu. You may need to disconnect and reconnect the video device in order to do this.

Click on the V temp menu and select the V temp settings option.

The V temp control window opens.



In the v Temp settings window you can set a sequence of segments to match the temperature program of your test instrument. Up to 10 segments can be defined. Each segment can be dynamic (heat or cool) or isothermal (constant temperature).
For each segment define the type with the dynamic or isothermal button and then enter the appropriate values.
Click the Add button to add a new segment, or the Delete button to delete the last segment.
Click the Clear button to clear all the segment data.
It may also be possible to synchronise the start of the temperature program and the video capture. For this you need a special cable (details are available from your vendor) and your heating device must also be able to trigger a signal switch at the start of the test. The DSC823e and DSC1 instruments from Mettler Toledo have such functionality when fitted with the peripheral option board. You must also select the commport to which the cable is attached on your PC and make sure the use synchronisation check box is checked.
When you have defined your segment(s) make sure the Use V temp check box is ticked and click the OK button to return to the main window.

Now set up the video file. If you are using synchro start then the video will begin saving automatically when the temperature program starts. Otherwise you must press the OK button on the paused screen when the temperature program starts.
. If you have set the correct program conditions the display will match the actual temperature of your instrument.

Video recording stops automatically at the end of the measurement.

Registration

Studio Capture can be used for evaluation purposes. During this time a watermark will be displayed on all images and video frames.

Once you have purchased Studio Capture you will be sent a user name and registration key.

To enter these Press the "Help" menu and "license" sub menu to open the registration window.

Enter your username and registration key and press the OK button.

This will remove the watermark.

Resizing the window

The program window can be resized by dragging the control handles or using the min/max/restore buttons in the top right hand corner.

You can also use the Video- set 100% menu or press the F2 key to set the video display to 100% of the resolution.

When the window is resized the video image is also resized to fit into the window. It should be noted that the video always retains the aspect ratio defined by the actual video resolution and this can result in the video image not completely filling the window or, alternatively, not being completely visible in the window. Please carefully adjust the window size to give a complete view of the video. It must also be noted that resizing the window does not affect the actual resolution of the video or image files saved.

Digitally zooming the image

A digitally zoomed area of the image can be displayed in a window. Click the zoom toolbar button to open the window. The window can display 1 of 5 areas of the image.

These can be selected from the Zoom window menu. The options are top left corner, top right corner, centre, bottom left corner and bottom right corner. The zoom window can be resized by dragging the corners to adjust the zoom level. To close the window, press the zoom toolbar button.

You can also copy the zoomed image to the clipboard using the edit/copy menu.

Changes in version 4

Studio Capture Version 4 has been optimised for use with Windows Vista® as well as Windows XP® operating systems and incorporates an updated video capture toolkit.
Studio Capture version 4 now allows up to 10 segments to be defined and used in V Temp mode.
If used with a METTLER TOLEDO DSC system, the video start can be synchronised using a special connection cable.

If you are upgrading from an earlier version you will need to purchase a software update license from your local vendor.

New features introduced in version 3 .1

Studio Capture version 3.1 introduces a new method of controlling the heating program. Sample Controlled Hot Stage Microscopy allows the heating rate to change during the measurement, slowing down as the sample changes, and speeding up when the sample is stable. This can be particularly useful for studying polymorphic transitions and crystallisations.

V-temp is a new function that allows temperature to be displayed onto the video file even if no direct temperature signal is available. This is useful for working with other thermal instruments such as DSC's.

New features introduced in version 3

Studio Capture version 3 incorporates a simple remote control function for the FP90 allowing you to interactively drive the hot stage from the software.

Studio Capture version 3 now supports the latest Windows XP style user interface.

New features introduced in version 2

Studio Capture version 2 incorporates a new video capture toolkit which supports the latest IEEE firewire digital cameras and wdm driver video capture devices for analogue video camera's.

The video display is now scaleable, allowing the program window to be resized.

A digitally zoomed area of the video can now be displayed.

The position of the text overlay can be adjusted.

The video start and stop can now be triggered by the FP90 hot stage controller.

The last used frame capture rate is saved and restored at the start of each session.

The last used FP90 Connection setting and autostart option are saved and restored at the start of each session.

The data logging setting is saved and restored at the start of each session.

The last used video compression CODEC is saved and restored at the start of each session.

The time display can be toggled between real time and relative time (since start of video file capture)

Still images can be captured individually or automatically in a sequence.

The line width of overlay items such as ruler and scalebar can be selected (Settings menu - line width)

Camera settings not available under the video/settings menu can now be accessed by using the IEEE set camera w/b menu.